Coprecipitation Standard Laboratory Module (SLM™)

General Overview of the Coprecipitation SLM

The Coprecipitation SLM automates the radionuclide coprecipitation procedure used by the Department of Energy (DOE) laboratories. The SLM accepts a beaker of solution containing a radionuclide and produces a filter plate on which the coprecipitated radionuclide has been deposited. The filter plate is subsequently presented to an alpha spectrometer to determine the type and concentration of radionuclide in the sample. This SLM makes use of the fact that certain elements attach themselves to certain rare earth precipitates; coprecipitation can be used to capture radionuclides on a solid matrix that can then be captured on filter media.

Environmental Protection Agency (EPA) Method

This SLM performs the coprecipitation procedure as described in the method compendium. These are not EPA methods, but variations of these procedures are employed across the DOE complex for routine radiochemical analysis.

Standard Analysis Method (SAM)

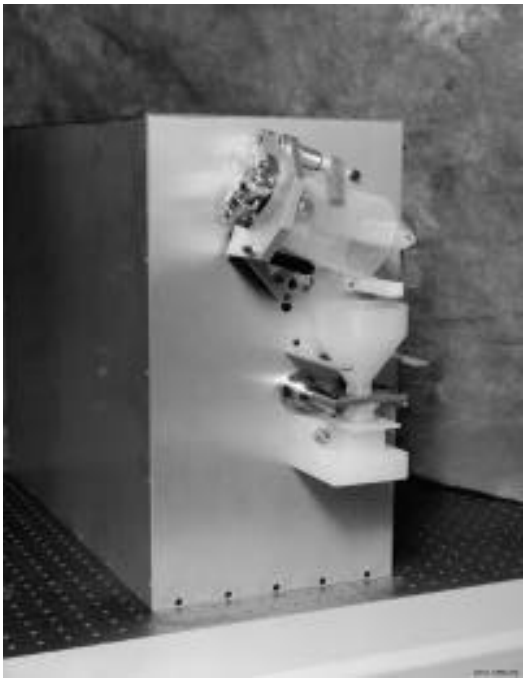
This SLM will normally be employed in a SAM used for radiochemical analysis.

Advantages

This SLM offers the advantage of automated operation, thus reducing labor requirements and possible human exposure to contaminants. It complies with Contaminant Analysis Automation Program protocols.

General Description of the Coprecipitation SLM

The Coprecipitation SLM accepts a beaker with a radionuclide in solution. It then adds a precipitating reagent automatically, and the beaker is agitated gently for approximately 20 minutes while the precipitate forms. Radionuclides in solution attach to the precipitate, which can then be filtered from the liquid. The SLM is



CN95-0273

Figure 1. A pouring operation within the Coprecipitation SLM.

equipped with a replaceable funnel, which is pressed against a filter disk to effect a tight seal. The precipitate solution is poured from the beaker into the funnel and onto the filter media. A vacuum is applied to the underside of the filter media to assist in pulling the solution through the media. The SLM monitors the process to completion and presents the empty beaker, funnel and filter disk to a robot or human operator.

Status

This SLM is in the proof-of-principle stage of development. It has not been chemically validated.

Industrial Partner

SciBus Analytical, Inc.

Developers

The Coprecipitation SLM was developed at Oak Ridge National Laboratory in the Robotics and Process Systems Division.

Robotics Technology Development Program

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Pacific Northwest Laboratories

INEL

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LALP-95-66
April 1995

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